

1       **INFLATING/DEFLATING DEVICE IN COMBINATION WITH AN**  
2       **INFLATABLE MATTRESS HAVING MULTIPLE CHAMBERS**

3       **BACKGROUND OF THE INVENTION**

4       **1. Field of the Invention**

5               The present invention relates to an inflating/deflating device and more  
6       particularly to the inflating/deflating device in combination with an inflatable  
7       mattress having multiple chambers such that the inflating/deflating device is able  
8       to inflate or deflate multiple chambers simultaneously.

9       **2. Description of Related Art**

10             It is to be noted that an inflatable mattress has only one chamber defined  
11       inside the inflatable mattress such that when a pump is connected to the nozzle  
12       on the inflatable mattress, the pump is able to quickly inflate (or deflate) the  
13       mattress. However, when the inflatable mattress has more than one chamber  
14       defined therein, the user will have to move the pump around to inflate another  
15       chamber after the first chamber has been inflated. That is, the user has to  
16       individually inflate each and every chamber in the mattress so that the user is  
17       able to comfortably lie on the mattress. However, because the user has to move  
18       the pump around the mattress to inflate each and every one of the chambers in  
19       the mattress, time and effort are wasted in moving, hooking and unhooking the  
20       pump to the mattress, etc.

21             To overcome the shortcomings, the present invention tends to provide an  
22       improved inflating/deflating device in combination with an inflatable mattress  
23       having multiple chambers to mitigate the aforementioned problems.

1     SUMMARY OF THE INVENTION

2             The primary objective of the present invention is to provide an improved  
3     inflating/deflating device having an inlet, multiple outlets defined in a casing of  
4     the inflating/deflating device, an air pump received in a room in communication  
5     with the inlet and multiple electromagnetic valves respectively received in a  
6     corresponding one of the outlets, such that after the electromagnetic valves are  
7     opened, activation of the air pump is able to conduct inflation/deflation to the  
8     chambers simultaneously.

9             Another objective of the present invention is to provide a linkage in  
10    connection with each one of the electromagnetic valves such that each  
11    electromagnetic valve is able to be activated or deactivated simultaneously with  
12    the other valve.

13            Other objects, advantages and novel features of the invention will  
14    become more apparent from the following detailed description when taken in  
15    conjunction with the accompanying drawings.

16    BRIEF DESCRIPTION OF THE DRAWINGS

17            Fig. 1-1 is a perspective view of an inflatable mattress with an  
18    inflating/deflating device on the side of the inflatable mattress;

19            Fig. 1-2 is a schematic view showing the inflating/deflating device has  
20    pipes in connection and communication with different chambers of the inflatable  
21    mattress;

22            Fig. 2 is a schematic view showing the internal structure of a second  
23    embodiment of the inflating/deflating device of the present invention;

24            Fig. 3 is a side view of another embodiment of the inflating/deflating

1 device of the present invention;

2 Fig. 4 is a cross sectional view of the inflating/deflating device in Fig. 3;

3 Figs. 5 and 6 are cross sectional views of the third embodiment of the  
4 present invention;

5 Figs. 7 and 8 are cross sectional views of the fourth embodiment of the  
6 present invention;

7 Fig. 9 is a circuit diagram applied to the embodiment in Fig. 7, wherein  
8 the power to the circuit diagram is alternating current;

9 Fig. 10 is a circuit diagram applied to the embodiment in Fig. 7, wherein  
10 the power to the circuit diagram is direct current;

11 Fig. 11 is a schematic view showing the inflating/deflating device used  
12 to inflate/deflate the inflatable mattress having three chambers;

13 Fig. 12 is a circuit diagram applied to the embodiment in Fig. 11,  
14 wherein the power is direct current;

15 Fig. 13 is a circuit diagram applied to the embodiment in Fig. 11,  
16 wherein the power is alternating current;

17 Fig. 14 is a schematic view showing the inflating/deflating device  
18 applied to the inflatable mattress having two chambers;

19 Fig. 15 is a circuit diagram applied to the embodiment in Fig. 14,  
20 wherein the power is direct current;

21 Fig. 16 is a circuit diagram applied to the embodiment in Fig. 14,  
22 wherein the power is alternating current;

23 Fig. 17 is a schematic view showing the inflating/deflating device  
24 provided with cable control mechanism; and

Fig. 18 is a schematic view showing the inflating/deflating device provided with a radio control mechanism.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figs. 1-1 and 1-2, it is noted that the inflatable mattress (1) has a main body (11) with a first chamber (12) defined in a front portion of the main body (11) and a second chamber (13) defined in a rear portion of the main body (11). An inflating/deflating device (2) is provided on a side of the main body (11) of the inflatable mattress (1) and has pipes (not numbered) in communication with the first chamber (12) and the second chamber (13) respectively.

With reference to Fig. 2, the inflating/deflating device (2) has a casing (21) with an inlet (211) and three outlets (212,213,214) respectively defined in side walls of the casing (21). A pump (22) is mounted inside the inlet (21) so that the pump (22) is able to suck air from the surrounding environment to the inflatable mattress (1) or deflate the inflatable mattress (1) by forcing the air inside the inflatable mattress (1) out of the inflatable mattress (1) from the inlet (211). Each of the outlets (212,213,214) has a controllable valve (23,24,25) to control opening of the outlets (212,213,214).

The valves (212,213,214) in Fig. 2 are controlled by electromagnetic switches (23A,24A,25A) so that after the coils (23A1,24A1,25A1) respectively mounted on the electromagnetic switches (23A,24A,25A) are energized, under the influence of magnetic field, the valves (23,24,25) are pushed to open and recoil springs (23A2,24A2,25A2) respectively mounted on the electromagnetic switches (23A,24A,25A) are compressed. Thus the outlets (212,213,214) are

1 open. The operator is able to use the pump (22) to deflate or inflate different  
2 portions of the inflatable mattress (1) simultaneously. After the power to the  
3 coils (23A1,24A1,25A1) is terminated, under the influence of recoil force from  
4 the springs (23A2,24A2,25A2), the valves (23,24,25) are pushed back to close  
5 the outlets (212,213,214).

6 With reference to Figs. 3 and 4, rotation of the knobs (23B,24B,25B) in a  
7 first direction is able to force the valves (23,24,25) to open the outlets  
8 (212,213,214) and compress springs (23B2,24B2,25B2) respectively mounted  
9 on the valves (23,24,25). With the activation of the pump (22) inside the inlet  
10 (211), the operator is able to inflate or deflate different portions of the inflatable  
11 mattress simultaneously. When the knobs (23B,24B,25B) are rotated in a second  
12 direction, the springs (23B2,24B2,25B2) are released to push the valves  
13 (23,24,25) back to close the outlets (212,213,214). Further a linkage (26) is  
14 provided to connect to each of the knobs (23B,24B,25B) and has three sets of  
15 ears (23B3,24B3,25B3) respectively formed on both sides of the knobs  
16 (23B,24B,25B) to ensure that the knobs (23B,24B,25B) can only be rotated  
17 simultaneously or individually in the same direction. Therefore, the operator is  
18 able to control the inflating portion inside the inflatable mattress to have  
19 different portions of the operator's body to be supported simultaneously or  
20 individually. For example, the operator is able to inflate the first chamber (12) of  
21 the inflatable mattress (1) to have full support to the operator's upper body or the  
22 operator is able to inflate the second chamber (13) to have full support to the  
23 operator's legs, as shown in Figs. 1-1 and 1-2.

24 With reference to Fig. 5, the controlling mechanism may adopt the

1 pushbuttons (23C,24C,25C). The pushbuttons (23C,24C,25C) are pushed to  
2 open the valves (23,24,25) and controlled by a linkage (28). In the meantime,  
3 springs (23C2,24C2,25C2) are compressed and outlets (212,213,214) are open.  
4 Therefore, the operator is able to use the pump (22) to inflate or deflate different  
5 portions of the inflatable mattress. When a master pushbutton (27) is pressed, the  
6 pushbuttons (23C,24C,25C) are released from the linkage (28). Under the  
7 influence of the springs (23C2,24C2,25C2), the valves (23,24,25) close the  
8 outlets (212,213,214). Thereafter, the master pushbutton (27) and the linkage (28)  
9 return to their original positions under the influence of springs (271,281). As  
10 shown in Fig. 6, it is noted that the pushbuttons (23C,24C,25C) are respectively  
11 provided with contact switches (23C3,24C3,25C3).

12 With reference to Figs. 8 to 10, it is noted that the controlling mechanism  
13 of the valves (23,24,25) may also control the rotation direction of the pump (22).  
14 A stop switch is the same as that of the master switch to release limitations to the  
15 other switches such that detailed description is omitted.

16 With reference to Figs. 11 to 17, it is noted that a wire controlling circuit  
17 in different embodiments is shown.

18 Figure 18 shows a wireless controlling circuit to be used in the  
19 controlling mechanism of the present invention. However, because the  
20 knowledge of wireless control is conventional, detailed description is omitted.

21 It is to be understood, however, that even though numerous  
22 characteristics and advantages of the present invention have been set forth in the  
23 foregoing description, together with details of the structure and function of the  
24 invention, the disclosure is illustrative only, and changes may be made in detail,

- 1 especially in matters of shape, size, and arrangement of parts within the
- 2 principles of the invention to the full extent indicated by the broad general
- 3 meaning of the terms in which the appended claims are expressed.